A BEHAVIORAL APPROACH TO THE PROBLEM OF SELF-CONTROL

by

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Ordinary, everyday uses of the terms "I" and "myself" seem to vary widely, although it also seems that one can identify common symbolic behavioral aspects of these uses. Certain persons who have suffered amputation of a hand are very clear that "the hand," and consequently, certain behavior is lost. There is no suggestion that part of "the I," "the me," or "the self" is lost. In contrast, other persons separated from a loved companion--or even from a loved landscape--express the loss as "it is as though I had lost part of myself" or, "part of me is gone."

Of course, if one defines "the I" and "the me," in contra-distinction to "the not I" and "the not me," as bounded by the skin (and possibly by the respiratory, gastro-intestinal and genito-urinary mucuous membranes) then in both the cases mentioned one can say the terms "I" and "me" are being used metaphorically or analogically. The introduction of such a subsidiary hypothesis hardly helps unless one agrees to operate in the frame of reference of the ancient humors[1]--where "the I" is in a good, or bad or what-not humor. It is probably more economical to assume

[1]As in the case of the ancient humors, the more recent instincts, motives, inherited factors, natural properties, etc., are frequently used as connoting occult forces to explain the course of behavior, particularly of the goal-directed type. Less commonly they are used as highly condensed symbols to denote extensive patterns of social behavior.

that language is a part of social behavior and has overt and covert aspects. The overt is interpersonal or intra-social, the covert is symbolic behavior, the necessary, but possibly not sufficient, mechanisms mediating which are intra-cerebral. Thus, we may not be too wrong if we speak of language behavior as a class of nervous system activity which has the capacity for orienting large amounts of other nervous system activity in the pattern similar or closely related to that in which the language activity was learned. Hortatorily, language behavior may orient the activity of the nervous systems of other persons in a similar manner, i.e., by evoking similarly their symbolic behavior to the extent that the coding system is mutually shared. Thus, the concept referred to as "the I" or "the self" in the problem of the self-control of behavior must be expanded to the set of social roles which are regarded as preferable by the reference group involved, including the probability that these patterns of interaction with the environment will be maintained. Sullivan dealt with this problem in his development of the concept of "the self-system." It is also of interest that insofar as late European royalty were considered to be "the law" or to be above "the law" they were referred to in the third person, not in the first.

In the social realm the coding system of symbolic behavior is a critical problem. Since symbols are digital, are arbitrary and are independent of real time and space, their manipulability--within the limits imposed by the symbols themselves

--is a function of the capacities of the "thinker" (whether man, machine or combination). For the same reasons the extent to which predefined behavior (overt or covert) can be evoked reliably by symbols in a wide variety of circumstances is very limited, unless ample time for learning the code is available. Not only the data to be operated on, but also instructions to start, the operations to perform, their sequence and instructions to stop must be symbolically given. Since living organisms cannot merely be turned on and off like machines, the transition states preceding and succeeding the required behavior also need attention. In everyday life most of these problems are met and instructions are given in what Jurgen Ruesch has called "the silent assumptions of communication." In this conference, however, we have to deal with situations in which the usual social assumptions may not apply and these sequences at least need to be mentioned.

For a considerable period preceding the modern era small, face-to-face groups and even larger socio-economic and national systems, were relatively stable. Under these conditions a person knew who he was, who he could rely on and what was expected of him. He had a "soul" and was committed to his fellows in the "normal human" value system. Under these conditions the doctrines of the will and of self-control were generally accepted along with the doctrines of reality, and of normal vs. abnormal. In retrospect these doctrines are hardly surprising, since events which could not be dealt with in these terms were the exception rather than the rule. With the social and technological revolutions of the

modern era, and the enormously increased vertical and horizontal social mobility, this situation no longer pertains. Simmel (11)* was the first to point out in this century that a human person (in distinction to his anatomy, chemistry, etc.) can only be defined in terms of his social group and of his role, status, function, etc., in that group. George H. Mead (5) later developed the concept of "the self" as the learned set of accepted or recognized social roles. Harry Stack Sullivan (9) extended this concept to his "self-system" and pointed out the relation of this system to his concept of anxiety and also to the concept of "reality" as social consensus. It was not possible, however, to deal with such concepts rigorously in even the simplest biological systems until the development of the concepts of cybernetics and communication as the flow of information in under-specified situations (i.e., in situations in which the system may be in one or other state and must therefore be dealt with probabalistically). The importance of the modern concepts for the problems of self-control of behavior under stress lies not in the direction of providing a better "explanation" of the phenomena, but rather it consists in providing a frame of reference which facilitates differentiating the phenomena into smaller segments, some of which may be independently manipulable.

In an informal seminar Harry Stack Sullivan discussed the doctrine of "the will" roughly as follows. He had not been

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* Numbers in parentheses refer to the item in the bibliography.

able to find behavioral or operational criteria to define any force or power driving behavior to which the term "will" might be applied. Rather, in any specific instance--for example, the will to go to an address in Washington--could be divided into "foresight" (based on previous experience) of the location and of the possible routes, comparison of the routes and decision on one or the other. This breakdown is not too dissimilar to the analysis of behavior by Miller, Galanter and Pribam in "Plans and the Structure of Behavior" (7). Their use of the Image and the Program as a hierarchical system of $TOTE_S$ (Test - Operate - Test - Exit) and the analogies they demonstrate between the behavior of organisms and the operations of computers provide a frame of reference of considerable use for the analysis of a variety of patterns of behavior. Such theoretical formulations immediately call attention to several independent functions which must be performed for maintaining the stable organization of behavior. For example, there is the problem of the selection of the objective from the available store of images; there is the necessity for maintaining the objective in mind while developing or selecting a plan for its attainment and also for controlling the course of the plan in action; there are the problems of decision between short plans requiring attention and/or physical effort and longer plans involving periods of waiting and so on.

Such systems for formulating data on behavior are effective mainly in those areas which are reasonably well known and in which the external load on the organism is not unusual.

In unusual circumstances, with increase in the external load and with decrease in the efficiency of the data processing mechanisms, it is preferable to formally take the environment into account. This can be done by defining behavior as the temporally structured interaction of the organism with the environment, as in a transactional system. The transaction can be defined as that interaction with the environment which is relevant to the attainment of a predetermined consummatory act or state. The transaction can be differentiated into the cue (environmental or from memory) at its onset, the course, the information controlling its course and the change in input at the termination of the transaction on attainment of the goal. Transactions can be dealt with hierarchically and the interaction with the environment can be formulated in terms of the somatic and cerebral mechanisms and in terms of the number of environmental factors involved which the degree of detail relevant to the problem in hand requires. The efficient use of a transactional system for formulating behavior requires, however, constant recognition that this is a mode of formulation and not in any sense an attempt at "explanation" or a statement of "causation." (Cf. J. Z. Young's comment (12) that "proof" of a proposition is equivalent to "satisfaction of the investigator's curiosity.") Further, and possibly more important, one must recognize that the initiation and termination of transactions are arbitrarily determined. Since the relevant events in the temporal course of the transaction depend on the initial state of the interacting system and on the consummatory act or state terminating the

transaction, the definition of these states or the assumptions made with respect to them are of primary significance. The advantage of the transactional system of formulation is that it assists in calling to attention data and operations likely to be occluded in the assumptions underlying classical approaches to behavior.

In considering the problems of the self-control of behavior under stress it is important to note that the aspects of behavior requiring attention vary with the transaction to be accomplished. The training, the information and the support relevant to maintaining reliable behavior in a rifleman, in an infantry company, in a commando, in a battalion combat commander, in a strategist at division level and so forth are very different. It is now quite apparent that there is no unitary function such as "self-control" and also no unitary function such as "stress." In the organism-environment transactional system there is a wide variety of functions which are independent, but which interact in the course of the transaction. To a considerable extent many of these different functions can be expressed in roughly quantitative terms, such as, the temporal duration, the number of sub-transactions into which the whole must be divided, the number of relevant environmental factors involved, the rate of data processing required, the clarity of the criteria for determining the relevance of data for the course of the transaction, the adequacy of the support of the brain by the body, the probability of successful accomplishment of subsidiary steps and the significance of such success to the total course, and so forth.

In most transactions of everyday life the goal virtually defines the course and also defines the probable subsequent goal and course--in Miller's terminology (7), the plan is part of the image. In transactions of any degree of complexity or of difficulty of execution it is not possible to maintain the ultimate goal clearly in mind while carrying out subsidiary steps. Here, however, use is made of language in its function of directing behavior and in its function of retrieving orientation in an incomplete transaction. In such sense, language may be regarded as a set of precomputed answers providing a variety of instructions for directing the course of behavior. Since language is arbitrary, but is primarily socially determined, its use in controlling behavior will depend on the characteristics of the subject's reference group and on the nature of his commitment to this group. Thus, in certain social groups there is a silent assumption that verbal communication is reliable over a considerable period of time, particularly when it is part of a contractual interaction. In other groups--or between members of different groups--no such implication may be involved. Memory of a command, agreement or verbal contract will have very different effects in these different situations. I emphasize the importance of the reference group since human symbolic behavior is a function of the social group and man is dependent on his symbolic behavior for maintaining transactions of any degree of complexity or duration.

I should also like to comment briefly on the concept of commitment. In a rigorous discussion of the problem of "person"

and "machine" Dr. Donald M. MacKay (2) points out that one "can exercise an option" and either commit oneself to a person or one can analyze a mechanism according to behavioral criteria. In commitment there is necessarily expectancy of adequate response to maintain the interaction, the objectives or purposes being determined by the interaction of the persons involved. These persons thus form a system, maintained by the reliability of the social communication. In contrast, study of a biological phenomenon on the basis of behavioral criteria and using operational formulations is the study of mechanisms, with the ultimate purpose of reproducing them deterministically according to logical criteria. Thus, the states of commitment-expectancy and that of analysis-reconstruction are two spearate realms of discourse. A person can be in one of them or in the other, but not in both simultaneously. Within limitations which have not been defined, it seems probable that one can retrieve some aspects of the course of a commitment-expectancy interaction from memory and subject them to study. Successive operations of this type, dealing with limited aspects of communication, would appear to be necessary to develop or learn and also to maintain the coding system. This problem will not be considered here further than to call attention to a question raised by Dr. MacKay (2), namely whether or not the phenomena of commitment to a person and of behavioral analysis of a mechanism are related to or clarify the "I-Thou" and the "I-It" concepts respectively.

Now, the reason for introducing the subject of commitment-expectancy is to note that in operations involving humans who are banded together to accomplish a mission the realm in which the operations occur is the realm of commitment-expectancy. The more complex the operation the greater the necessity for reliability of the social communication which maintains commitment-expectancy. Such reliability is even more significant in human groups composed of members responsible for different functions, especially when one or more members must be separated from the face-to-face relationship for periods of time.

The organization of behavior (apart from that completely specified by the function-structure of the organism and of the environment) requires a goal, since the goal determines the relevance of information and the course. The possibility of establishing distant goals subsequent to immediate objectives by exercise of "foresight" and of maintaining the retrieval of these goals reliably in decision making is limited. In situations in which the probabilities of the course of a transaction are too uncertain to be used for anticipatory guidance of behavior, effective control of the organization of behavior may be exercised by limiting attention to the prescribed program, i.e., to performing the prescribed, separate acts without attention to the distant goal. It is routine to make decisions on difficult or insoluble problems-in-living according to the accepted mores and, under stress, according to the accepted verbal formulae of the reference group. Presumably there is the assumption that the social group will provide support or, at least, acceptance if the accepted

moral principles are followed, regardless of the consequences. Under extreme stress acceptance as a member of the group--even as a "bad" member--with its capacity to maintain the organization of behavior is preferrable for some persons to the threat of "not being a person" and of the catastrophic reaction (the "anxiety," in Sullivan's sense) which is likely to ensue. Anecdotes from combat situations[2] and clinical observations of schizophrenic panics ("it took over") give support to this formulation. It seems likely that these phenomena are the basis for the somewhat hyperdramatic concepts of "cosmic anxiety," "religious anxiety" and so forth of a number of recent psychiatric theories. A considerable variety of formulations--from, let us say, "Valhalla" to "Fate"--have been used to control the structuring of information on the course of events and to occlude ignorance in order to avoid the problem of selection of goals (change of goal) in the course of a stressful transaction.

The concepts of stress and of anxiety have developed in biology and psychiatry as though they were two integrated states of the organism for which single measures could be found. Some authors have treated anxiety as an emotion and practically always the subjective phenomena are emphasized. Such views of stress and of anxiety have been useful in opening up this field, but are proving inadequate. As more data are obtained it is becoming clear that we will have to define the load on the organism, the organism's response and the further course of the interaction of the organism with the environment. The state of the art is by

[2] S.L.A. Marshall has discussed this problem in detail in Men Against Fire (3).

no means such that these problems can be dealt with in anything approaching a definitive manner at present. It is proposed here, therefore, only to draw attention to a few phenomena in order to illustrate the nature of the problem.

The increased load of a cold, external environment appears to have very different effects on men depending on the adequacy of their protective clothing. There are well substantiated anecdotes of men on expeditions who attempted suicide by exposing themselves to the cold in little more than their underwear. In at least two cases about which I have heard, the men suffered severe cold injury of their extremities, nose, ears, etc., but found shivering in the cold so disturbing that they returned to shelter in time to avoid dying. In contrast, it is well known that if a man in adequate protective clothing lies down to "rest" in severe cold he can freeze to death with no shivering or discomfort. The difference in response seems to be due to the effect of the rate of heat loss on the sensory cold transducers. Phenomena of this type clearly show that the concept of "homeostasis" refers to the general tendency of living organisms to maintain the continuity of their functional existence, but not to any integrated mechanism. "Homeostasis" is achieved fortuitously and only within certain limits, the limits being different for the various components of the multiple systems which control one or another aspect of the organism's interaction with the environment.

It is of course quite apparent in the preceding illustration that with the load of "cold" a man's successful response

depends on so-called "cognitive" functions. This principle, however, is no different from that applying to other species. Numerous animals can only survive under "heat" load, for example, by searching for and finding a cool place to lie down in. A number of other problems concerned with inadequate responses to increased loads which may lead to death are described in a panel discussion: "The Psychophysiology of Death" (8).

It is important to bear in mind that the range of load that the organism can tolerate without serious disturbance is markedly reduced with decrease in the capacity for data processing, i.e., for "thinking." This is of particular significance under those conditions in which metabolic disturbances result in what Dr. Adolf Meyer used to call "the failure of the body to support the brain." Examples include heavy physical effort, food (calories) deprivation, sleep deprivation and so forth. Although in these conditions the duration of the stress may be the critical factor, clear formulation of the intermediate and of the ultimate goals and thorough training in the operations to be performed have a potent effect on the maintenance of the control of behavior. The capacities for judgment and planning are lost earliest, probably due to the loss of ability to maintain attention and to store and/or retrieve current information on the course of the transaction. Increased frequency of "lapses" of attention was a function of duration of sleep deprivation up to 90 hours in the studies of Williams, Lubin and Goodnow (10). However, most of the subjects who were given a goal of 72 hours could not stay awake at 73 and 74 hours, whereas subjects with a goal of 96

hours showed no unusual difficulty until the goal was reached. Various subjective phenomena seemed to be more related to the approach to achieving the goal than to the actual duration of wakefulness (6). Although adequate data are not available, a few measurements indicate that the prolonged deprivation type of load does not evoke adrenal responses, in spite of the fact that the subject may "feel" seriously uncomfortable. It appears that both the adrenal cortical and medullary responses are part of a system called into play by immediate physical involvement with the environment or on anticipation of such involvement.

In the course of studies of emotional disturbance in monkeys, Mason and his associates (4) found that the blood levels of 17 hydroxy-corticosteroids and of nor-epinephrine were elevated routinely following painful stimuli or following a conditional stimulus (light, buzzer, etc.) signalling a painful stimulus. In contrast the blood levels of epinephrine remained unchanged except under particular circumstances. These circumstances included completely novel experiences (such as the first time blood was drawn); presentation of a stimulus which signalled that one or other of several stimuli would be presented, each of which indicated a different ultimate event; and, having trained the monkey to avoid a shock by pressing a lever at appropriate intervals, giving him two or three "free" shocks during a ten minute test period. Uncertainty or ambiguity concerning the course of events is common to these situations. One may say that they

place the monkey in a situation which for him is "open ended." It thus appears that this characteristic is either more strongly alerting or that there are qualitatively different responses evoked by threatening situations depending on whether the course is known (and the subject is, as it were, committed to a known response) or whether the course is not known and it is necessary to wait for further information to direct action. In both cases, the general behavior of the animals has been roughly the same as to movements and autonomic manifestations.

In another series of studies Friedman, Mason and Hamburg (1) have found that humans under prolonged stress show very different patterns of adrenal cortical responses. The 24-hour excretion of 17 hydroxy-corticosteroids has been measured in parents of children during the terminal stages of lukemia. Wide differences in the excretion rates have been found for different people, though the rate for any one person over very long periods stays in the high, intermediate or low categories. With particularly distressing events most people tend to excrete increased amounts of 17 hydroxy-corticosteroids. However, some people in the low excretion group may show a paradoxical response and secrete less at the time of events which most people find disturbing. Psychiatric and psychological data being collected have so far shown a remarkably good correlation with the hormonal data, indicating that we are dealing with total patterns of response rather than with merely differences in adrenal functions. How these patterns of response may be related to more or less effective handling of different types of stress still must be determined.

In summary, we may note that for purposes of analysis the concepts expressed as "the will," "self-control" of behavior under "stress," and so forth must be expanded in two directions. Firstly, the behavior referred to needs to be described in terms of the social roles of the reference group and in terms of the reliability of social communication in the group. Secondly, it is necessary to expand these concepts in terms of the characteristics of the load on the organism and in terms of the mechanisms involved in the changing interactions of the organism with the environment in response to the load. There is no single factor such as "the will" or such as "stress." The problems of selecting, training and operating with personnel under unusual circumstances will require identification and study of the different classes of unusual circumstances. These are no longer academic problems, but call for much closer relationships between scientific analysis of behavior and human operations in the field.

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